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An Integrated Safety Measurement Model: A New Perspective for Performance Measurement In Healthcare

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About WMG Service Systems Group

The Service Systems research group at WMG works in collaboration with large organisations such as GlaxoSmithKline, Rolls-Royce, BAE Systems, IBM, Ministry of Defence as well as with SMEs researching into value constellations, new business models and value-creating service systems of people, product, service and technology.

The group conducts research that is capable of solving real problems in practice (ie. how and what do do), while also understanding theoretical abstractions from research (ie. why) so that the knowledge results in high-level publications necessary for its transfer across sector and industry. This approach ensures that the knowledge we create is relevant, impactful and grounded in research.

In particular, we pursue the knowledge of service systems for value co-creation that is replicable, scalable and transferable so that we can address some of the most difficult challenges faced by businesses, markets and society.

Research Streams

The WMG Service Systems research group conducts research that is capable of solving real problems in practice, and also to create theoretical abstractions from or research that is relevant and applicable across sector and industry, so that the impact of our research is substantial.

The group currently conducts research under six broad themes:

- Contextualisation
- Dematerialisation
- Service Design
- Value and Business Models
- Visualisation
- Viable Service Systems and Transformation

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An Integrated Safety Measurement Model: A New Perspective For Performance Measurement In Healthcare

1: Introduction

Performance measurement systems provide an opportunity not only to determine if organisations are effectively delivering their strategy and meeting their vision, but also to enable improvements. In 2009, the NHS implemented the NHS Performance Framework (Department of Health 2009), which has since been altered yearly in line with changing governments and policy alterations. Although originally designed to be applied to Primary Care Trusts (PCTs) from April 2010, the NHS reform, which seeks the replacement of PCTs with GP Consortia, has rendered the framework redundant in primary care (Department of Health 2010a). Since then, the NHS Outcomes Framework (Department of Health 2010b) has been published, and focuses on 5 outcome domains that are expected to show national level performance across the whole of the NHS. This high level system has failed to provide a performance picture of any individual service, of which there are many, in addition to proving reliant on outcome (lagging) indicators which have long been recognised as a poor singular method for measuring performance (Eccles and Pyburn 1992; Kaplan and Norton 1992). This study advocates service specific performance measurement and the engagement of stakeholders during the design process to develop leading and lagging indicators of value to the stakeholders. This is in particular with efforts to shift the onus onto patients to maintain health; as is true of the case management programme, which forms the case study for this research. The case management programme aims to reduce expensive hospital admissions for patients with complex long term conditions (LTCs) (Department of Health 2005). It expects to be able to achieve this by implementing a case management approach to oversee the most at risk patients, to develop an integrated care plan and to empower patients to become actively involved in their care at home. This paper will present the underlying literature that supports the development of a safety measurement model and describes the methodology used to gain validation by a key stakeholder group.

2: Method

There were two phases to the research; model development and model validation. A structured literature review was conducted that covered three topic areas to build a comprehensive model a safety performance for case management; performance measurement, safety and case management. Performance measurement and safety were reviewed, covering both generic research and healthcare specific. Articles on case management included Department of Health publications pertaining to the care of patients with long term conditions to understand policy and guidelines, and scholarly articles on their implementation.

An Integrated Safety Measurement Model was constructed from the literature and identifies the key stakeholders of safety in the case management programme and proposes domains for measurement. Following development of the model, validation was sought from the staff stakeholder group. Three focus groups were

held at 3 different Primary Care Trusts (PCTs) for a length of 90 minutes. Participant numbers were 4, 5 and 8. PCTs were approached purposefully because they were delivering case management care to the specified patient group. Recruitment of participants was achieved through the delivery of a presentation at the monthly team meeting, after which attendees were able to volunteer for participation. Focus groups were held at PCT premises, video and audio recorded, transcribed and thematically analysed.

3: Model Development: literature review

3.1: Performance Measurement: purpose and design

Performance measurement has been described as *'the process of quantifying the efficiency and effectiveness of action'*; a system of which is a *'set of metrics used to quantify both the efficiency and effectiveness of actions'* (Neely, Gregory et al. 2005). These authors refer to effectiveness as the extent to which customer requirements are met, and efficiency as the economics of resource utilisation for providing a given level of customer satisfaction. Furthermore, performance measurement systems should reflect the strategic vision of the organisation (Brown 1996; Fitzgerald and Moon 1996; Kaplan and Norton 1996), include past, present and future perspectives (Brown 1996) and motivate behaviour leading to continuous improvement (Lynch and Cross 1991). Given this, performance measurement should also be customer centric; considerate of their needs, and how they can be met, in order to determine to what extent they are met in line with company strategy.

Performance measurement system design concerns itself with the process of determining performance measures, their application and continuous improvement, evidenced by the content of published design frameworks (Wisner and Fawcett 1991; Kaplan and Norton 1993; Neely, Gregory et al. 2005). Their founding principles include an understanding of the mission statement and strategy and the identification of the business unit for measurement. This study focuses on the NHS's desire to deliver high quality and safe care with respect to the case management program delivered to patients with multiple and complex long term conditions.

2.2: Performance Measurement in the NHS

In primary care, the NHS Outcomes Framework, first introduced in 2011 (see figure 1) is used to determine performance. Meyer describes 7 purposes of performance measures; to look back, look forward, compensate, motivate, roll up, cascade down and compare, yet the NHS Outcomes Framework is only aligned with two of these; look back and compare. Lagging indicators, such as outcomes, provide a historical view of performance, providing little predictive insight or current standings.

The NHS outcomes framework lacks process measures (leading indicators) which are measures of activity or behaviour. The purpose of process measures is twofold: to drive positive behaviours that are known to produce desired outputs and to reduce variation in the quality of outputs (Brown 1996). With respect to the domain of safety (domain 5) which uses the number of patient safety incidents reported as an outcome indicator, there is a risk of inadvertently encouraging negative behaviour. Since reporting of incidents is voluntary, if the performance measurement system seeks a reduction in reported incidents, people could stop reporting which would

show false success and put patients at risk, where improvements could have been made had errors been identified. Process measures contribute to 3 of the 7 purposes identified by Meyer above; look ahead, motivate and compensate.

The Outcomes Framework is a high level performance measurement system and does not indicate the performance of any specific service, department or team and therefore lacks another key characteristic; business unit measurement (Lynch and Cross 1991). The absence of business unit specific measures makes cascading down and rolling up difficult. The NHS Outcomes Framework is absent of some fundamental functions of performance measurement systems.

Donabedian first introduced the notion of the three approaches to measuring quality in healthcare, namely, structure, process and outcome (SPO) (Donabedian 1966). Structure refers to settings in which care takes place and is concerned with facilities, equipment, staffing and organisational systems. Process covers the process of care or whether the correct procedures are properly carried out. Finally, outcomes, the currently used indicator of care quality, are the results experienced by the intervention. Since 1966, the SPO approach to quality has been widely accepted and adapted for use in a variety of situations, most relevantly, in the measurement of care quality in healthcare, but additionally it has been applied to traditional quality improvement efforts (Sainfort, Ramsay et al. 1994; Kunkel, Rosenqvist et al. 2007). The SPO approach has been applied to generic systems, but also to specific, local systems such as trauma (Cornwell, Chang et al. 2003) and surgery (Closs and Tierney 1993; Birkmeyer, Dimick et al. 2004; Nguyen, Mahbod Paya et al. 2004), as well as to systems more relevant to this research setting; nursing (Ramsay, Sainfort et al. 1995; Wong and Chung 2006), the elderly (Closs and Tierney 1993) and long term conditions care (Mant 2001). Research has been conducted that considers which of the domains contributes most to patient assessment, but research is lacking that uses patient experience and perception to determine indicators for measurement. This could be due to the lack of patient control over the structure and process in more traditional healthcare environments and thereby limiting their contribution. However, in case management, their responsibilities have greatly increased and similarly their potential for contribution.

2.3: Safety in Healthcare

Safety in healthcare has come under scrutiny since the publication of 'To Err is Human' (Institue of Medicine 1999) in 1999, in which the authors claimed that up to 98,000 people died as a result of harm in America each year. In the NHS, as many as 1 in 10 inpatients come to harm during their care as a result of an adverse event (Department of Health 2000). Furthermore, half of these deaths are considered to have been preventable (Vincent, Neale et al. 2001; O'Connell, Ben-Tovim et al. 2008). The need for safer services through design is well documented (Sirio, Segel et al. 2003; Carayon, Schoofs Hundt et al. 2006; O'Connell, Ben-Tovim et al. 2008), yet little research exists to understand safety or how to better measure it in order to help drive improvement. Current methods in the U.K. rely heavily on the voluntary reporting system maintained by the NPSA, or for research purposes, through retrospective record review. There is no prospective or real time analysis of the state of safety in healthcare. One reason for this could be the difficulty of defining errors which has proven to be subjective and differs between stakeholder groups (Robinson, Hohmann et al. 2002). Furthermore, a research gap exists, particularly in case management at home, in utilising patient perspectives of safety to attempt to determine influencing factors which could be measured.

2.4: Case Management for Long Term Conditions

In 2005, the Department of Health (Department of Health 2005) implemented, a nationwide case management programme for patients with multiple, complex long term conditions who had multiple hospital admissions. The purpose of this was to contribute to reaching the PSA target of a 5% reduction in hospital admissions. Despite the independent evaluation of 9 pilot case management programmes which did not provide evidence to support a contribution to this target (Gravelle, Dusheiko et al. 2007), the service was rolled out. The case management programme was designed to provide on-going, supportive care to this patient group in their own homes whilst being overseen by a community matron; an advanced nurse practitioner. Their main functions include developing a patient centred care plan, managing its delivery, being a central point of contact, to encourage integration of services between other organisations and to educate and empower patients. Care is delivered in the home and is intended to support the patient to self care.

2.5: An Integrated Safety Measurement Model

The Integrated Safety Measurement Model (see figure 2) is presented as two layers; stakeholders and measurement domains. The model identifies 3 key stakeholders of the case management programme for patients with long term conditions; the provider, staff and patients. What is new about this model is the identification of patients as stakeholders of their safety, which differs to hospitalised care where onus is more on the provider and staff. Patients now have control over their environment, their care plan and its delivery, placing great emphasis on themselves to ensure their safety in their home.

The purpose of identifying key stakeholders in the model is not only to determine those who should be involved in the design process of the measurement system, but also who the indicators should measure. Current methods for monitoring safety,

predominantly executed in hospitalised care, pay little attention to the role of the patient and the burden of accountability lies on the healthcare organisation and professional. With the balance of healthcare shifting towards community based care, consideration needs to be given to how this changes, what it means to be safe and how to deliver safe care in this new era of healthcare.

The Integrated Safety Measurement Model utilises the structure, process and outcome approach first identified by Donabedian and described above (Donabedian 1966). Although originally devised to measure quality, not specifically safety, Lord Darzi defined quality has having three aspects; patient safety, patient experience and effectiveness of care (Department of Health 2008). The SPO model allows measures to be devised that look both forward and back to be able to effectively determine cause and effect relationships.

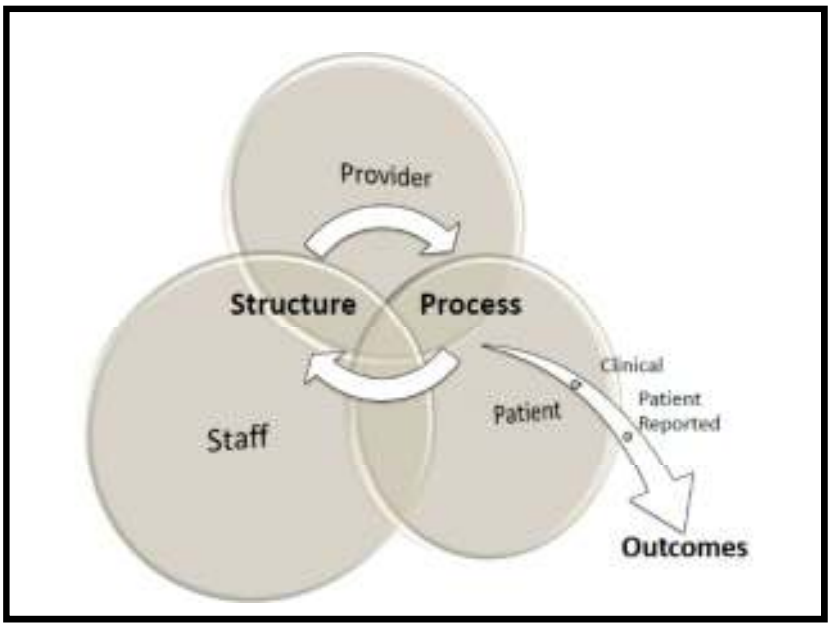

Figure 2: An Integrated Safety Measurement Model

4: Model Validation – staff focus groups

4.1: Stakeholders

The model was validated by staff who deliver the case management programme. They felt confident that the key stakeholder included at least the provider, the staff and the patient. In addition, they considered a further stakeholder made a large and significant contribution to the safety and health outcomes of the patients. This stakeholder group included informal carers who might be friends or relatives.

The concept of the provider as a key stakeholder generated debate over who was or who were the providers. This research examined the NHS as a provider; however,

staff of the NHS argued that other organisations such as social services, independent care providers and charity organisations have an important role to play. Given this argument, the staff stakeholder group also extends beyond the NHS and into the other organisations mentioned above.

4.2: Domains

The validity of the domains was determined by their ability to fairly represent, and be inclusive of, influencing factors identified by the staff in the focus groups. Table 1 provides an outline of the factors discussed and how they relate to each of the domains.

Domain	Factors
Structure	Equipment Provision, level of cleanliness and tidiness, communications, service availability, staffing and case load, training, employee satisfaction
Process	Maintenance of self care, patient adherence to care plan
Outcome	Hospital admissions, minimum data set, patient satisfaction surveys

Table 1: Factors discussed in staff focus groups and their related domains

5: Discussion

This study identifies key stakeholders of the case management programme for LTCs and engages with one key stakeholder to validate a safety measurement model developed from the literature. Furthermore, it provides a better understanding of their perspective of the concept of safety, risk factors and outcomes which will contribute to the development of a proactive safety measurement framework. The Integrated Safety Measurement Model presented here is a service specific model that aims to inform the development of a safety performance measurement framework by identifying key stakeholders of the case management programme and domains of measurement. This is by no means intended to represent a full performance overview of the service and concentrates specifically on patient safety.

The case management programme in England is designed to target the most at risk patient group of hospital admissions, between 3 and 5% of the LTC patient population (Hutt, Rosen et al. 2004) and equating to approximately 640,000 people. The current NHS Outcomes Framework provides a broad overview of the NHS as a whole which reaches a National population of over 60 million through a large variety of services delivered through multiple organisations. The Integrated Safety Measurement Model presented above provides an opportunity to target service specific populations, by focusing the NHS vision of delivering safe healthcare and thus aligning itself with a fundamental principle of performance measurement. Furthermore, it engages with a key stakeholder group to gain better insight into the perceived risks of this stakeholder group, which reflect the proposed measurement

domains, and validating them fit for purpose. Further work is on-going to engage with other key stakeholders namely, patients and carers.

The findings of the qualitative data collection method provided overwhelming support for four key stakeholders of safety in the case management programme. In addition to the three identified in the model, staff of the case management programme felt strongly about the contribution made by carers to their patient group and even suggested that without their input patients would be at risk of hospitalisation or being cared for in a nursing home, representing a valuable resource to the NHS. Adaptations will be made to the model to align with the findings of the research once other stakeholders have contributed.

Although, this research was conducted through the NHS, the findings indicate that the NHS is not the only organisation responsible for ensuring the safety of this patient group. A variety of other organisations contribute including, but not exclusively, social services, charities, local authorities and independent care agencies. Given the nature of the case management programme, which was to deliver integrated care services co-ordinated through a single case manager, it seems feasible that other organisations would be involved. Further work would be needed to determine the nature and level of their involvement and to work towards a multi-organisation method of measurement in order to ensure that an holistic approach to measurement is attained, which would be conducive to delivering a fully integrated care service.

The use of Donabedian's structure, process and outcome model as the measurement domains in the Integrated Safety Measurement Model, aligns with the NHS vision of quality which includes patient safety. Lord Darzi defines quality as having three components: patient safety, patient experience and effectiveness of care (**Department of Health 2008**). In addition, measuring safety would meet some of the criteria of a performance measurement system as described by Neely et al: *'the process of quantifying the efficiency and effectiveness of action'* by quantifying the extent to which customer requirements are met. The nature of the structure and process domains enables indicators which are leading and help to provide a futuristic view as well as an historical view generated by outcome (lagging) indicators. Further and more current work will help to determine what the customers or patients requirements are in relation to safety which is key to delivering patient centred care.

6: Conclusion

Although the NHS employs a different care model for patients being case managed to those in acute care, the model of safety they use does not reflect this. The NHS is reliant on lagging indicators which lack capacity to identify cause and effect relationships and therefore provide no predictive insight as to the safety of a service. The Integrated Safety Measurement Model presented here aims to support efforts to move towards a service specific, prospective, holistic approach to safety measurement in healthcare, that utilises both leading and lagging indicators to measure performance and drive improvements. By identifying key stakeholders and engaging with them to gain an understanding of their perspectives and by identifying risk factors and outcomes, there is the potential to develop the work further to generate a measurement framework that is stakeholder centric.

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